Claims :

1. A diffractive grating element (SG) arranged on or embedded within a light-transmittive, preferably planar waveguiding substrate (S) and arranged to interact with an incident light wave (W) in order to couple the energy from said incident light wave (W) into said substrate (S) to form at least one diffracted light wave (R_{-1},R_{+1}) propagating within said substrate (S) and corresponding to at least one selected diffraction order, **characterized** in that the grating element (SG) is divided into at least two different grating regions (BG_{left},BG_{right}; MBG_{left},MBG_{right}) each having different diffractive properties and arranged on opposite sides respect to a transition point (TP) to form a splitted grating element, where the diffractions generated by said at least two different grating regions (BG_{left},BG_{right}; MBG_{left},MBG_{right}) are arranged to mutually compensate for the variation in the input angle (θ) of the incident light wave (W) to the total diffraction efficiency of the at least one diffracted light wave (R_{-1},R_{+1}) propagating within said substrate (S).

2. The diffractive grating element (SG) according to the claim 1, **characterized** in that in said splitted grating element (SG) the grating profile of at least one of the grating regions (BG_{left},BG_{right}; MBG_{left},MBG_{right}) has asymmetric period profile, preferably blazed period profile.

3. The diffractive grating element (SG) according to the claim 1, **characterized** in that said splitted grating element (SG) is arranged to be symmetrically splitted, i.e. the element comprises two grating regions (BG_{left},BG_{right}) whose grating period profiles are arranged to be substantially mirror images of each other respect to transition point (TP).

4. The diffractive grating element (SG) according to the claim 1, **characterized** in that said splitted grating element (SG) comprises at least two grating regions (BG_{left},BG_{right}) whose grating period profiles are arranged to have substantially different depths.

5. The diffractive grating element (SG) according to the claim 1, **characterized** in that in said splitted grating element (SG) the diffraction efficiency of at least one of the grating regions (BG_{left},BG_{right}; MBG_{left},MBG_{right}) is arranged to vary at different local distances measured from the transition point (TP).

6. The diffractive grating element (SG) according to the claim 1, **characterized** in that the transition point (TP) is arranged to be located within the area where the incident light wave (W) first interacts with the splitted grating element (SG).

7. The diffractive grating element (SG) according to the claim 1, **characterized** in that the first interaction of the incident light wave (W) with the splitted grating element (SG) is arranged to take place substantially within a single grating region (MBG_{right}).

8. The diffractive grating element (SG) according to the claim 7, **characterized** in that at least one of the grating regions (MBG_{left}) is arranged to redirect or recirculate the light wave waveguided within the substrate (S) back towards reverse direction inside the substrate (S).

9. The diffractive grating element (SG) according to the claim 1, **characterized** in that the splitted grating element (SG) is arranged to enlarge the exit pupil of an optical system.

10. The diffractive grating element (SG) according to the claim 1, **characterized** in that the splitted grating element (SG) is arranged to enlarge the exit pupil of a biocular or monocular optical system.

11. The diffractive grating element (SG) according to the claim 1, **characterized** in that the splitted grating element (SG) is arranged to enlarge the exit pupil of a virtual display.